Russian River Habitat Focus Area

Floodplain Restoration through Reclamation of Abandoned Gravel Mines.

Brian Cluer

NOAA



Michael Beck

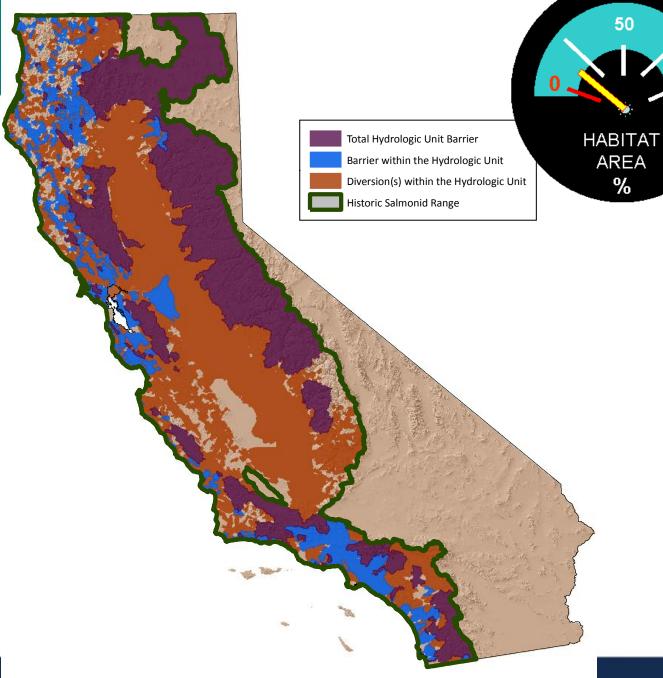


Mark Strudley



Thanks also to:

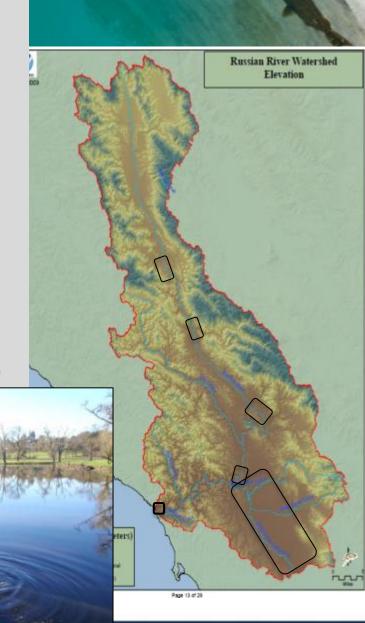
John McKeon Charleen Gavette Melanie Harrison Sean Hayes Jon Nelson - USGS Brian Bair — USFS Nancy Schaefer Rand Derrico Habitat
Minimized:



Every alluvial valley and deposition zone, that once held off channel habitat and particularly floodplains and wetlands, is modified, disconnected, converted to sediment transport reaches.

Deposition zones were likely habitat rich, and protected freshwater deeps,

i.e.: the Laguna.

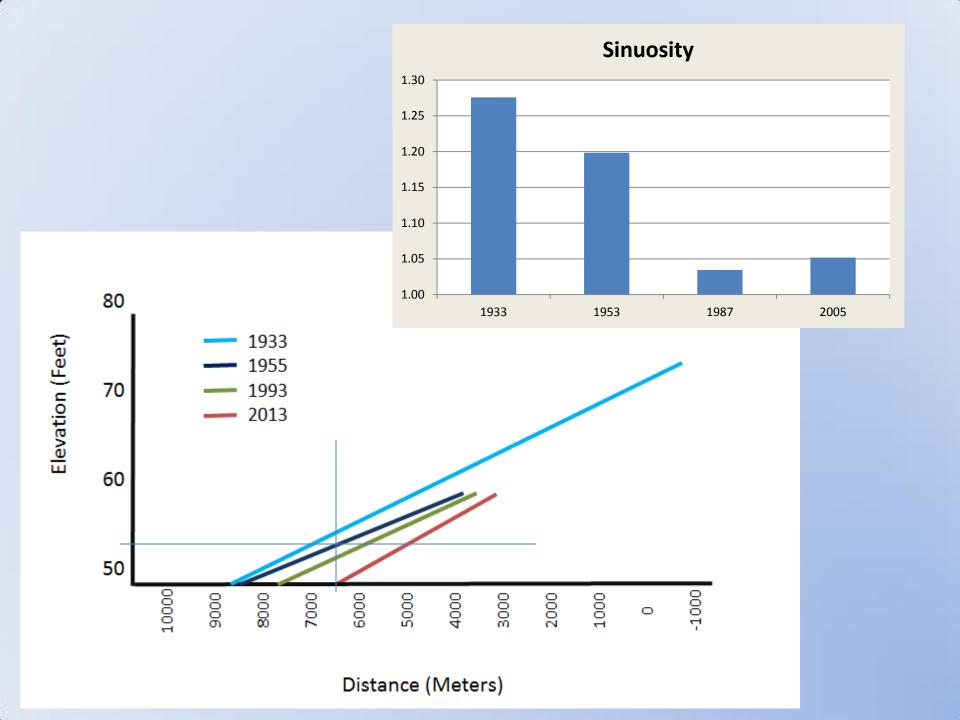


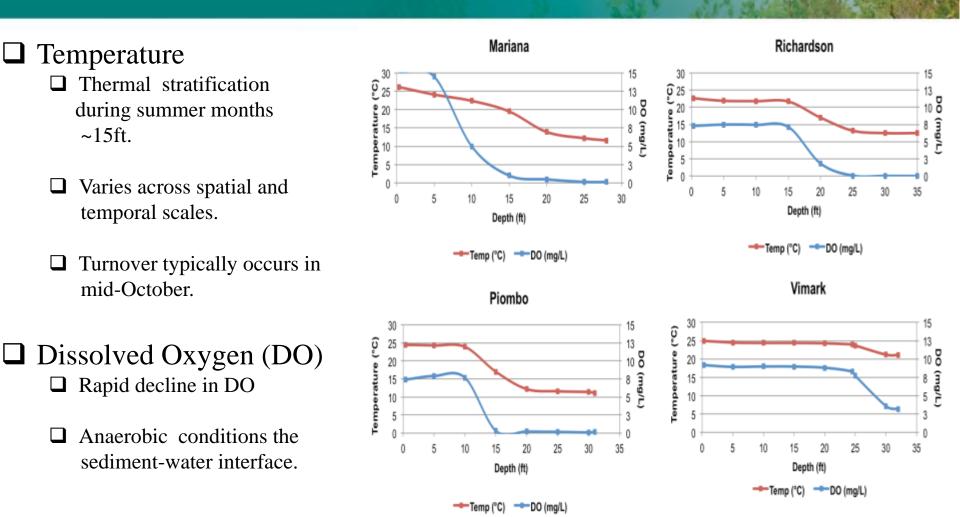




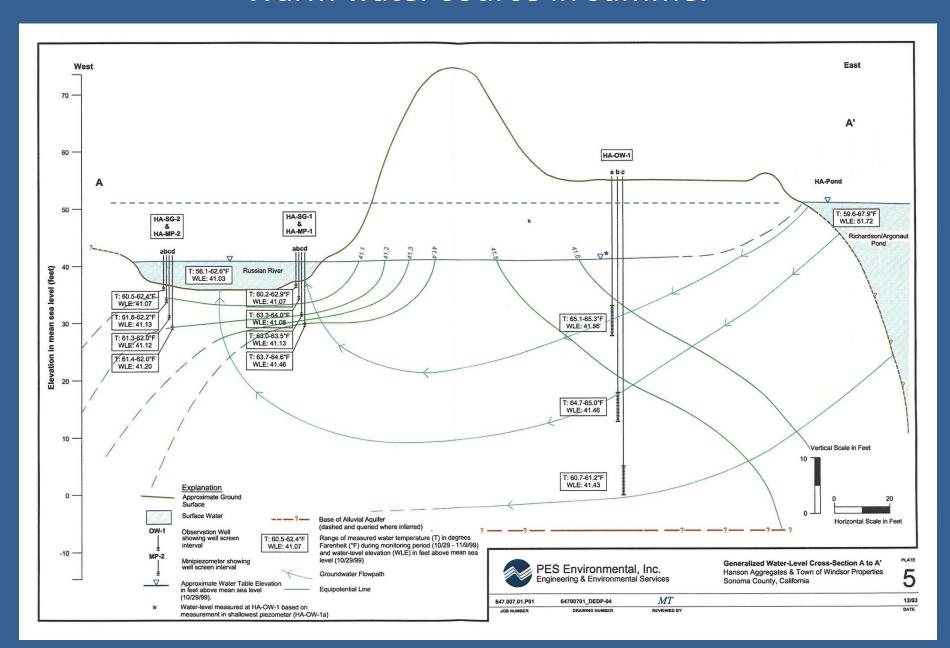


Riverfront Park: 2012 weir repairs washed out after 1st storm





Warm water source in summer



Ponds' Current Biogeochemistry

Naturally occuring Hg

Hydrologic transport, accumulation of Hg

Legacy high total Phosphorous

Anaerobic mineralization, recycling Phosphorous

= cyclic phytoplankton blooms = high available total carbon for mercury meththylizing anaerobic bacteria.

Bio-accumulation.



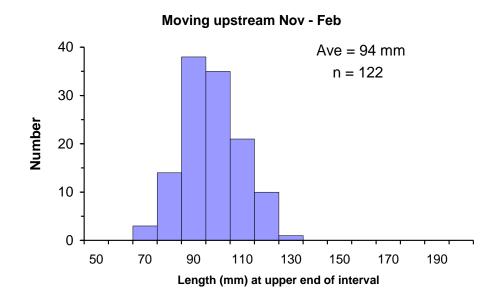
Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river

Carson A. Jeffres • Jeff J. Opperman • Peter B. Moyle

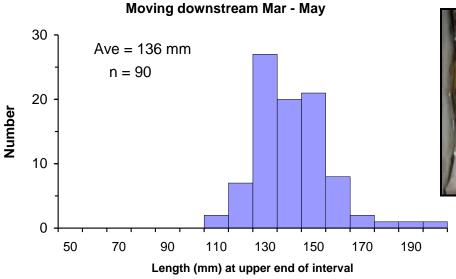


Fig. 7 Comparison of a single enclosure of fish reared in intertidal river habitat below floodplain (*left*) and a single enclosure of fish reared in the floodplain vegetation (*right*) after 54 days in respective habitats at the end of the second year of the study

Size Comparison of a Coho salmon parr Migrating Into (fall), and Subsequently Out of (spring) Lower Klamath tributary Off-Channel Habitat.



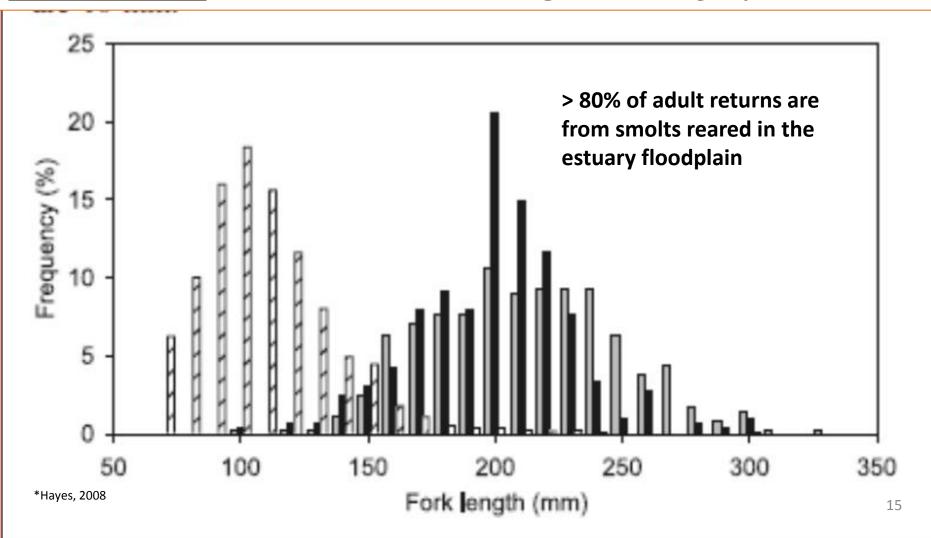






Smolt To Returning Adult Success*

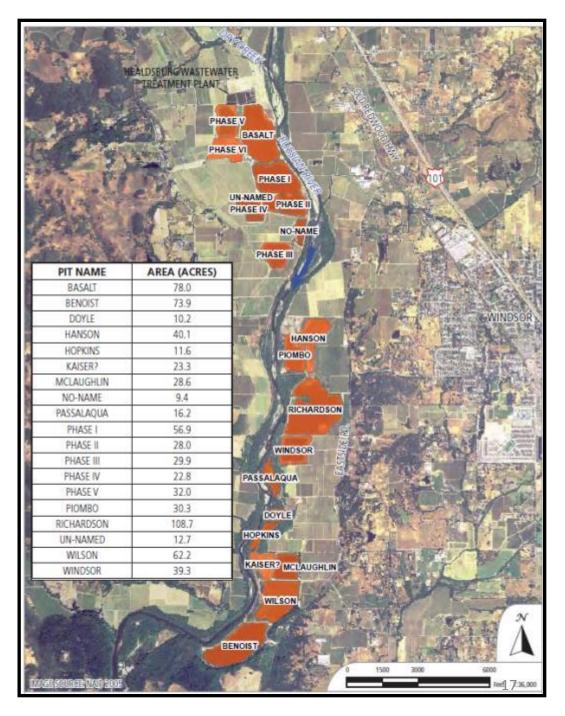
<u>Size</u> from rearing in upstream habitat - hatched bars <u>Size</u> from estuarine floodplain rearing - black bars. <u>Ocean entry</u> smolt size of **Returning Adults** - grey bars



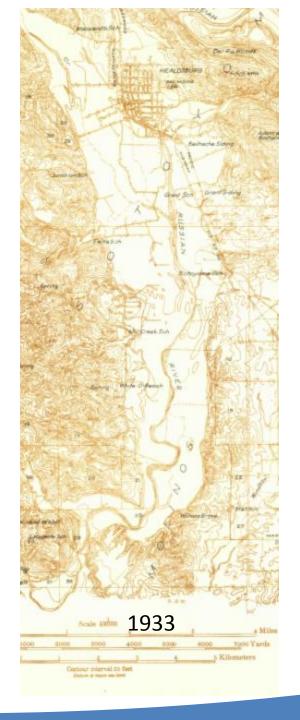
RR Middle Valley

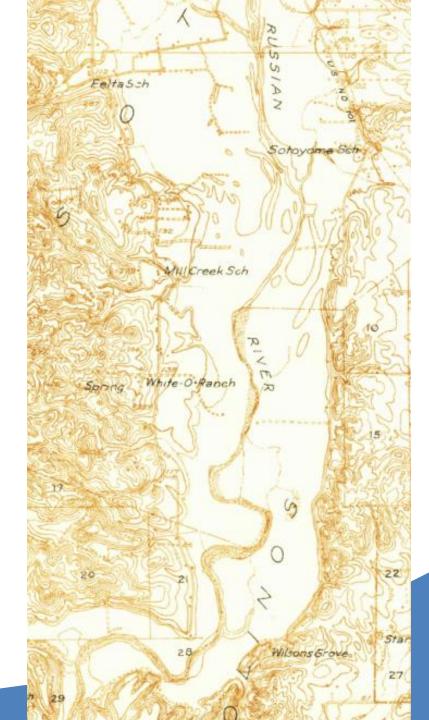
~800 acres of pits.

Current mine reclamation law and land management approach: maintain isolation of pits and river in perpetuity.







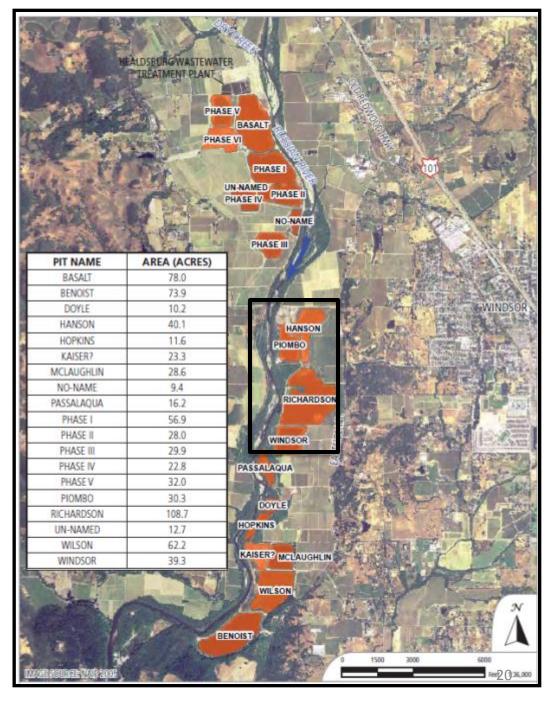


1942

- Channel migrated across floodplain as point bars built up and cut banks eroded
- 3,200 acres active floodplain
- Sediment load was "processed" in the valley
- Some fraction was exported

2013

- Channel confined to a single straightened path
- 807 acres active floodplain
- Sediment load is exported
- Some fraction is deposited on alternate bars within the channel
- 720 acres pits





What goals are reasonable?

- Historical Assessment
- Fisheries / Habitat connections
- Opportunities
- Feasibility
- Constraints

Plan

Design Fund Implement

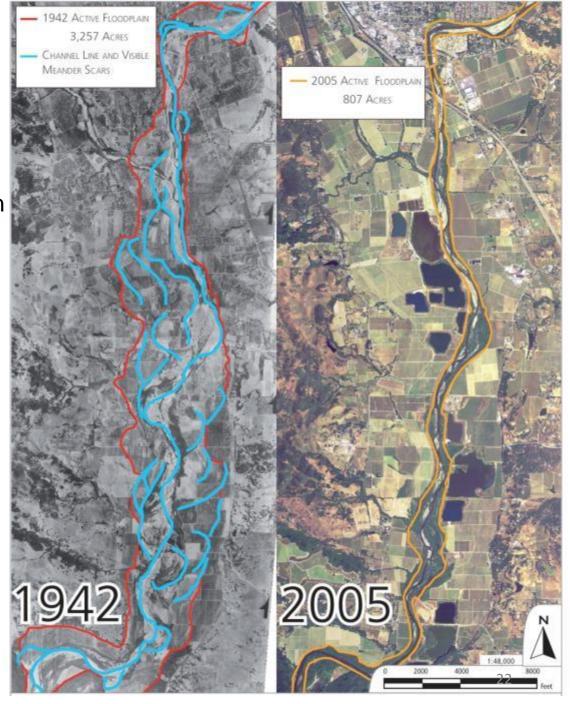
Middle Reach

1942

- 3,257 acres active floodplain
- Sediment load deposited on floodplain
- Channel migrated across floodplain as point bars built up and cut banks eroded

2005

- **807 acres** active floodplain
- Sediment load deposited on alternate bars within the channel
- Channel confined to a single straightened path



From: Mitch Swanson

Mapping

- LiDAR
- Hydro
- Hydraulic
- Sediment
- WQ

Modeling

- Terrain
- Flow field
- Sed Trans



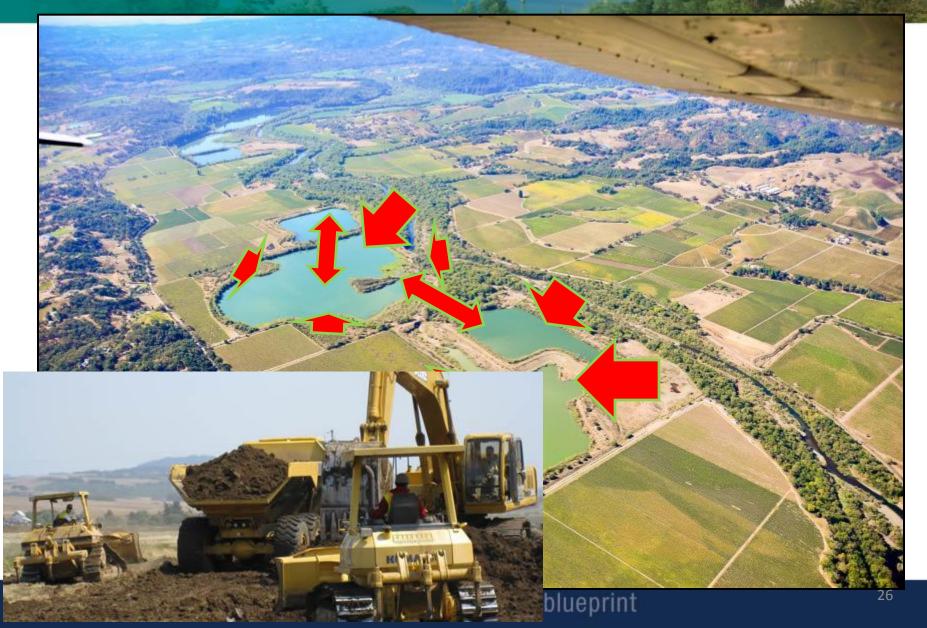


Existing





CONCEPT



Concerns

- Property stability
 - Pit capture
- MeHg production
- Predators
- Water supplies
 - Windsor
 - SCWA
- Salmon losses

Advantages

- Sediment processing
- Management of:
 - MeHg + nutrients
 - Water temp
 - Predators
 - Levee bursts
 - Property losses
- Ground water recharge
- Salmon feeding habitat
- Flood attenuation

Increasing resiliency to flooding

- Quantify sediment inputs into downstream, flood-prone reaches
- Temper the flood pulse (magnitude and timing) through velocity reduction and interaction in a floodplain-wetland complex
- Long-term sediment storage and 'metering' provided by new depositional architecture of the restored reach
- Reduction in incision and bank erosion through a) increased lateral accommodation space (flows widen) and b) the reworking of sediment across channel bars and multiple-stage inundation zones
- Departure from 'hungry water' through sediment availability and mobility.

Planning Process

- Historical Assessment
- Fisheries / Habitat connections
- Opportunities
- Feasibility
- Constraints
- O Plan
- O Design
- O Fund
- O Implement

Timeline

March 2014

Larger Initiatives:



Floodplain pits: a global problem, science gap



Questions?

- Concerns
- Data gaps
- Information
- Opportunities to collaborate and leverage resources